

Comparing the effects of low-level and high-level worker need-satisfaction: A synthesis of the self-determination and Maslow need theories

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Abstract According to Maslow's (Psychol Rev 50:370–396, 1943) hierarchical theory of needs, people do not become sensitized to “higher” level needs until they have satisfied their “lower” level needs (a moderator hypothesis); until then, they are unprepared to benefit from higher-level satisfactions. But according to the self-determination theory (SDT) model, high-level psychological needs, when met, are non-contingently beneficial (a main effect-only hypothesis). In two large-N studies of Russian energy companies, we measured low-level need-satisfaction in terms of felt security and felt financial satisfaction, and measured high-level need satisfaction in terms of SDT's basic needs of autonomy, competence, and relatedness. In both studies, both the lower level and higher level need-satisfaction sets had strong main effects upon many positive work outcomes, including intrinsic motivation, organizational commitment, and SWB. In Study 2, Maslow's “prepared to benefit” hypothesis was supported, in that satisfaction of high-level needs had slightly larger effects on outcomes when combined with satisfaction of low-level needs. However this was not found in Study 1. Potentials for integrating the SDT and Maslow need theories are discussed.

Keywords Psychological needs · Basic needs · Maslow's theory · Self-determination theory · Organizations in Russia · Well-being at work · Work engagement

Introduction

Abraham Maslow's hierarchical theory of needs (1943, 1962, 1971) remains influential, doubtless because of the intuitive plausibility of the idea that people cannot appreciate or strive for “the finer things” until they have “the basics” taken care of (Neher 1991; Wahba and Bridwell 1976). Stated more formally, the theory implies that there is a moderator relationship such that people's attention can only move up to more psychological and subtle needs (e.g., intimacy, self-esteem, personal growth) once their lower-level needs (e.g., biological, safety, security) have been satisfied; and conversely, that having salient unsatisfied lower-level needs should dampen or reduce the effects of higher level needs. The thwarting of pre-potent lower-level needs might undermine higher-level satisfactions by distracting people and preventing them from giving full attention to higher level experiences; by stressing or angering them and coarsening their appreciation of those experiences; or by providing too-large of an emotional deficit for the high level experiences to make up. We might call this an “unprepared to benefit” scenario (Sheldon et al. 2002), in which only those whose lower-level needs are satisfied are ready to fully benefit from higher-level satisfactions. For example, a temporary worker, living from paycheck to paycheck, is unlikely to cultivate higher-level satisfactions within the work context.

However, one can also imagine a moderator relationship going in the other direction, such that high-level satisfactions especially impact well-being and motivation when

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lower level needs are *unsatisfied*. The finer things may be especially sweet when one is missing the basics, because they remind one of what is waiting on the other side of one's current struggles. Or, higher-level need-satisfactions may be especially impactful or important when times are tough, because they counteract the strain and sense of hopelessness that can arise when one's security is a prevailing concern. We might call this a "buffering against adversity" scenario (Cohen and Wills 1985), in which high-level satisfactions can keep a struggling individual's well-being from plummeting too far, even in the absence of basic-level satisfaction. For example, an activist striving to change the culture of his/her company may tolerate many hardships, because of the nobleness of his purpose or the quality of her relationships.

Finally, it is also possible that there are no moderator effects at all; perhaps low- and high-level need satisfactions are both important in their own right, and do not influence each other's effects (a parallel main effects model). In this simpler view, there are no contingencies between lower and higher levels of need-satisfaction: as far as well-being and personal equanimity goes, the more satisfaction the better, regardless of what type of satisfaction it is.

It is appropriate to consider all three of these possibilities because in fact, the support for Maslow's hierarchical model has been very mixed. Sometimes the "prepared to benefit" proposition finds support, but other times the opposite ("buffering") effect is found, and other times, no moderator relationships are found (Wahba and Bridwell 1976; Neher 1991; Sheldon et al. 2001). Neher (1991) and Reid-Cunningham (2008) provided penetrating analyses of some of the conceptual difficulties with Maslow's theory, which might explain the inconsistent support found for its main propositions. Perhaps the most salient of these difficulties concerns the difference between viewing needs as motivating or energizing forces which can cause behavior, versus viewing needs as felt satisfying experiences which can result from behavior (Sheldon 2011). Maslow, and many need theorists (McClelland 1985), implicitly assumed that satisfactions and motivations are the same thing, although inversely related; motivation always arises from dissatisfaction, and always falls when satisfaction is achieved. Indeed, this "satisfaction reduces motivation" notion provides part of the mechanism for explaining how motivation and attention can move "up" the hierarchy when lower needs are met. However, it is easy to think of cases when feeling strong low-level satisfactions (like eating a favorite comfort food or hugging a security blanket) might boost, rather than reduce, further motivations for those satisfactions, depending on person's general circumstances, the time-scale of measurement, and many other possible factors (Neher 1991). Conversely, the

assumption that absent satisfaction always breeds motivation to get the absent experiences is also tenuous for multiple reasons (Reid-Cunningham 2008), as can be seen even in the case of the (low-level) biological drive for food, whose functioning can become disrupted in the case of anorexia. If people can fail to take action to get the physical nutrition they need, surely they can fail to take action to get a positive psychosocial experience that they need? In part to address such issues Sheldon (2011) proposed a "two process" model of psychological needs, which clearly distinguished between needs-as-experiences and needs-as-impulses (in this article we focus on need-experiences).

In the current studies we examined the issues in a new way, with the help of a more contemporary psychological needs theory than Maslow's: self-determination theory (Deci and Ryan 1985, 2000). Although SDT certainly acknowledges that people's basic living conditions influence their health and well-being, SDT is primarily concerned with psychological conditions, asking whether people's social environments and their own personality structures support their movement towards greater integrity, wholeness, and growth. Specifically, SDT proposes that all human beings have three basic psychological needs: (1) to experience feelings of autonomy (that one is the owner and author of one's behavior); (2) to experience feelings of competence (that one is effective and masterful in one's behavior); and (3) to experience feelings of relatedness (that one is intimately connected with important others). Dozens of studies have shown that satisfying these three needs helps people to function well and to thrive in many different ways, whereas when the needs are not satisfied (i.e. when people feel controlled, incompetent, and isolated), ill-being and disruption of functioning results. Furthermore, studies show that the needs tend to have parallel main effects on outcomes, rather than moderating each other's effects (Ryan and Deci 2008; Sheldon 2011; Sheldon and Filak 2008). The more people report having all three types of experiences, the better off they are.

In the present studies we used the three SDT needs in substitution for the three higher-level needs originally specified by Maslow's theory, because of theoretical problems with two of Maslow's three proposed high-level needs (Neher 1991). According to Maslow, beyond the two (relatively uncontroversial) low-level needs for biological sustenance and safety/security, there are two somewhat higher needs: for love/intimacy, and for self-esteem/self-regard (the relative hierarchical ordering of the love and self-esteem needs varies in different versions of Maslow's theory). These higher-level needs are said to arise naturally after people manage to construct a reasonably safe and biologically sustaining lifestyle. Beyond these two needs is a fifth, highest-level need, for self-actualization. The self-

actualization need does not arise until all four of the lower level needs had been satisfied, and according to Maslow (1943), is rarely expressed in normal human beings; indeed, only a few paragons (such as Albert Einstein and Eleanor Roosevelt) become self-actualizing.

Although love/intimacy (also called relatedness or belongingness) is uncontroversial as a basic human need (Baumeister and Leary 1995), considerable research has raised questions concerning the status of self-esteem as a basic psychological need (Crocker and Park 2004). Some researchers (Crocker and Park 2004; Deci and Ryan 2000; Sheldon 2011) have suggested that a need for competence or effectance (White 1959) may be more basic than a need for self-esteem, because effectance strivings arise early in development and remain salient for adaptation throughout the lifespan, whereas self-esteem strivings arise later in development and may reflect mere “compensatory” responses to ego wounds or developmental deficits (Crocker and Park 2004; Vansteenkiste and Ryan 2013). There are also questions concerning self-actualization as a basic psychological need (Sheldon et al. 2001), because the concept of self-actualization remains ill-defined and poorly researched, because the idea that people only become self-actualizing after everything else has gone right for them is dubious (what role for adversity?), and because of the seeming elitism of the idea that only a tiny percentage of people can be self-actualizing (Neher 1991; Reid-Cunningham 2008).

We suggest that using SDT’s three basic needs (autonomy, competence, and relatedness) to represent the “higher” level of a purported need hierarchy, instead of Maslow’s proposed love/intimacy, self-esteem, and self-actualization needs, is a good solution to these problems. It is actually not much of a departure, because relatedness and love/intimacy are essentially the same, because competence is a reasonable alternative to self-esteem in that both involve receiving positive feedback concerning one’s qualities and abilities, and because autonomy is a reasonable alternative to self-actualization, given that SDT views autonomy as the quintessential expression of people’s growth and developmental processes (Ryan et al. 1997). A second reason using the SDT needs provides a good solution is that SDT views the three needs as having equal footing in terms of their relative importance, allowing the three SDT needs to be considered together to represent the higher level of a two-level hierarchy. This is appropriate because when support is found for a hierarchy of needs, it tends to indicate only two, rather than five, levels (Sheldon et al. 2001). A third reason this is a good solution is that using the SDT needs may provide for a good contemporary updating of Maslow’s theory, given that the evidence base for the three SDT needs has become so large.

In the current studies we addressed the lower-level psychological needs in the following way. First, we as a

stand-in for lower-level biological/physiological needs, we assessed financial security. We assumed that employees of a large and stable national company do not have direct worries about shelter, sleep, and sustenance; however, they may worry about the amount of their pay, which limits the quality of the physical nutrients and comforts available. To assess the safety/security need we focused on the stability of the work context, the social insurance within the work context, and confidence in the future. We did not focus on relationship security because that is the provenance of the higher-level relatedness need.

Again, the “higher levels” of worker need-satisfaction were represented directly by the three SDT needs. This is appropriate because much recent research has demonstrated the relevance of psychological needs for understanding the optimal functioning of employees and the organizations in which they work (see Gagné and Vansteenkiste 2013, for a review).

Our primary hypotheses were: (1) that the three SDT needs would each have significant effects upon the worker outcomes we examined, supporting SDT’s contention that these really are basic psychological needs; (2) that the two “lower-level” needs would also have significant effects, because pay and job-security are legitimate and important concerns and goods for workers; and (3) that there will be few if any moderator relationships between low-level and high-level needs, and that any moderator effects found will be very small and/or will not replicate across studies. H3 is based on the past inconsistent findings regarding this aspect of Maslow’s theory, and is also based on SDT’s presumptions regarding the non-contingent or universal effects of the three basic (high-level) needs upon outcomes. Finally, we also ventured a fourth hypothesis, that (4) the higher-level need-satisfactions might *mediate* between lower-level satisfactions and well-being.

We reasoned that finding evidence in support of H4 might provide a new type of support for Maslow’s contingency theory of needs, by showing that the effects of low-level satisfaction are somewhat indirect, occurring in part via the higher-level satisfactions they enable. In other words, having one’s basic security and financial needs met might provide people with a foundation or platform for the subsequent procurement of the SDT needs, which in turn might account for some of the positive effects of low-level need satisfaction upon well-being. We tested these hypotheses in two large panel studies of white- and blue-collar workers of Russian energy, water and heating companies ($N_1 = 4708$; $N_2 = 10,331$) using two different measures of need satisfaction and multiple indicators of well-being and motivation at work (well-being, work engagement, work achievement, intrinsic work motivation, organizational commitment, burnout, boredom, and alienation at work).

Study 1: Methods

Participants and procedure

4708 blue- and white-collar workers of a Russian energy company participated in the study, which was described as “aiming to improve organizational factors for better well-being and performance.” There were 3106 males, 1602 females, ranging from 18 to 75 years old (mean age 42.57 ± 11.21 years old), sampled from six Russian regions. Job positions included 494 low-level (10.5 %), 1949 middle-level (41.4 %) and 127 high-level (2.7 %) blue-collar workers, 182 (3.9 %) service people, 1054 specialists (23.5 %), 612 direct managers (13.0 %), 249 middle-level managers (5.3 %), and 41 (.9 %) high-level managers. As a means of comparing different types of jobs in testing demographic Hypothesis 3, the first four groups were combined to create a sample of “blue-collar” workers, while the three manager groups were combined to create a sample of “white-collar” workers.

Participants filled out the surveys during their work time, which were presented via organizational interface. To decrease social desirability effects and enhance honest responding, respondents did not provide their identities. The first part of the survey consisted of the psychological assessment, whereas the second part of survey consisted of socio-demographic (age, gender, marital status, children, education level) and organizational (job position, part of the organization, general length of work, length of work in organization, length of work in current job position) questions. For analyses examining the possible moderating effects of demographic variables, we treated marital status (married vs unmarried) as a dichotomous categorical variable, and coded education level via five dummy-coded variables representing differing levels of education ranging from high school to Ph.D.

Measures

Low-level versus high-level need satisfaction

Two different assessment strategies were employed to measure need-satisfaction. First, we chose 14 items from the Russian Questionnaire of Job Satisfaction (RQJS; Batarshv 2002), which measured worker’s satisfaction with financial issues (2 items), security/stability (3 items), and also their feelings of autonomy, competence and relatedness on the job (3 items each). All the items were presented with a 1–5 Likert scale. Second, we developed a list of 14 work conditions, the “wish for organizational change” (WOC) measure, which covered satisfaction with finances (2 items) and security at work (3 items), as well as satisfaction of the three SDT needs (3 items each).

Participants were asked to appraise each condition by choosing one of the five possible answers: “No changes needed”, “Small improvements could be made”, “Improvements could be made”, “Large improvements should be made”, “Requires complete revision.” All the answers were then reversed to represent the level of satisfaction with organizational conditions. Example items for both scales are given in Table 1; a full list of items is presented in Table 6 (see Appendix 1).

Principal components analyses of the low-level satisfaction items uncovered a 2-factor structure of security versus financial satisfaction for the RQJS items, which explained 70.37 % of the variance with loadings in the range .72–.91. Thus we computed separate security and financial satisfaction scores. For the WOC measure 69.18 % of variance was also accounted for by two factors corresponding to security versus financial, with loadings of .56–.93. Thus we computed security and financial scores for the WOC measure as well. For both the RQJS and the WOC, principal components analyses of the high-level need satisfaction items revealed the expected 3-factor structure of autonomy versus competence versus relatedness need-satisfaction satisfaction, explaining 65.07 and 72.26 % with loadings of .66–.86 and .66–.87 for two measures respectively. As can be seen in Table 1, all the individual scales for both the RQJS and the WOC measures were internally consistent, and so were the low-level need-satisfaction (average of security and financial) and high-level need-satisfaction (average of autonomy, competence, and relatedness) composites.

Outcome measures

General well-being was measured using Russian versions of the Satisfaction with Life Scale (Diener et al. 1985) and the positive and negative affect schedule (PANAS, Watson et al. 1988). To create a single aggregate well-being measure, we standardized and combined these three variables (e.g., well-being = satisfaction with life + positive emotions – negative emotions). Principal components analysis of these variables supported the existence of a 1-factor structure which explained 50.2 % of the variance (Busseri 2015; Busseri and Sadava 2011; Diener 1994).

Well-being at work was measured by two scales, the Organizational Commitment Questionnaire (OCQ; Mowday et al. 1979) and Utrecht Work Engagement Scale (UWES; Schaufeli et al. 2006, Schaufeli and Bakker 2003). The OCQ includes 15 items concerning whether workers consider themselves as belonging to the organization and feel attached to and proud of its values and processes (for example, “I find that my values and the company’s values are very similar”). We used eight items from the UWES, which measures employees’ sense of energetic

Table 1 Study 1: Scales and example items

Scale Satisfaction with...	Items	Item examples or scales included	Cronbach's α
<i>RQJS measure</i>			
Security	3	I feel security, stability and confidence in the next day	.71
Financial	2	My salary fits my qualifications, knowledge and skills	.82
Autonomy	3	My work lets me learn new things	.76
Competence	3	My job position doesn't fit my abilities (negative item)	.61
Relatedness	3	I like the people that I work with every day	.76
Composite low-level satisfaction (RQJS)	5	Mean of security and financial	.71
Composite high-level satisfaction (RQJS)	9	Mean of autonomy, competence, and relatedness	.74
<i>WOC measure</i>			
Security	3	Guarantee of stable employment, confidence that will not be fired	.70
Financial	2	Payment	.62
Autonomy	3	Support of worker's initiatives	.81
Competence	3	Match of my work to my abilities	.78
Relatedness	3	Relationships in the department	.81
Composite low-level satisfaction (WOC)	5	Mean of security and financial	.79
Composite high-level satisfaction (WOC)	9	Mean of autonomy, competence and relatedness	.87

involvement in their work activities (for example, “At my work, I feel I am bursting with energy”). The UWES contains a ninth engagement item, but a problem with translation rendered that item unusable.

Professional achievement was assessed using three further items from the RQJS (Batarishev 2002): “Recently I have achieved success in my job position”, “Every month I feel how my professional knowledge is growing up,” “Recently managers of my divisions told me that they are satisfied with my work” (Cronbach's $\alpha = .62$). All the items were appraised on 5 point Likert-type scale.

Intrinsic work motivation was appraised using three items from the Professional Motivation Questionnaire (PMQ; Osin et al. 2013): “I work here because I like this job”, “I work here because it's interesting to do what I do at work”, “I work here because it's a pleasure to do this work” (Cronbach's α in this study was .93).

Results

Table 2 presents descriptive statistics and correlation for all the measures. First we examined the convergence of the two measures of need satisfaction. As shown in Table 2, the on-diagonal correlations were all higher than the other correlations within each row (with the exception of one tie), indicating that the two measures were assessing reasonably parallel constructs. This occurred despite the fact that the RQJS mostly employs positively-worded items

concerning one's own feelings at work, and the WOC employs negatively-worded items concerning organizational factors that need to be changed at work.

Next we compared the lower-level and higher-level need satisfaction variables as predictors of the well-being, engagement, commitment, achievement, and intrinsic motivation variables, examining both main effects and moderator effects. We constructed two different sets of regression models, one for the RQJS need-satisfaction measure and one for the WOC need-satisfaction measure. We intended to interpret only those moderator effects that replicated across both measures of need-satisfaction. In each model, the five predictor variables were first centered. Then the two low-level satisfaction variables (financial and security) were entered at Step 1, and the three SDT variables (autonomy, competence, and relatedness) were entered at Step 2. At Step 3 a product interaction term was entered, computed by multiplying together the aggregate low-level satisfaction variable and the aggregate high-level need-satisfaction variable. We focused on these two aggregate variables at Step 3 both to simplify the analyses, and because the Maslow's theory does not suggest interactions between *particular* needs; instead, it implies interactions between lower-level and higher-level needs, broadly construed.

In all of the analyses (see Table 3), satisfaction with finance and with security were both significant predictors of general well-being and organizational commitment and—to lesser extent—of intrinsic work motivation,

Table 2 Study 1: Descriptive statistics and correlations between variables

Scales	<i>M (SD)</i>	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. RQJS—security	3.24 (.69)	.38	.36	.28	.31	.33	.38	.38	.22	.27	.59	.32	.45	.37	.39
2. RQJS—financial	2.65 (1.07)		.25	.30	.10	.54	.38	.42	.35	.24	.33	.23	.44	.23	.30
3. RQJS—autonomy	3.87 (.80)			.29	.44	.20	.21	.26	.12	.24	.44	.59	.55	.76	.57
4. RQJS—competence	3.45 (.90)				.21	.33	.29	.35	.49	.30	.34	.27	.42	.27	.40
5. RQJS—relatedness	4.25 (.56)					.08	.16	.18	.15	.34	.38	.34	.36	.45	.40
6. WOC—financial	2.79 (.89)						.63	.68	.51	.43	.37	.24	.44	.20	.29
7. WOC—security	3.14 (.92)							.71	.51	.46	.39	.22	.38	.22	.25
8. WOC—autonomy	3.21 (.98)								.55	.58	.45	.31	.51	.27	.33
9. WOC—competence	3.49 (.91)									.44	.30	.17	.33	.14	.26
10. WOC—relatedness	3.93 (.94)										.39	.25	.36	.26	.31
11. Well-being index	.00 (2.13)											.46	.57	.44	.48
12. Work engagement	4.48 (13.32)												.61	.53	.55
13. Organizational commitment	59.88 (12.09)													.51	.62
14. Professional achievement	1.88 (2.26)														.49
15. Intrinsic work motivation	11.40 (2.90)														

Predicted correlations between the subscales of the two need satisfaction measures are bolded. All $ps < .01$

professional achievement and work engagement. However, adding autonomy, competence and relatedness in the equations significantly improved prediction. For the RQJS measure, all three high-level need-satisfaction scales were significant positive predictors of all five outcomes (15/15 effects), while for the WOC measure, 12 predicted effects were significant (there was a significant competence effect on only two of the five outcomes). Overall, Hypotheses 1 and 2 were well supported, in that the SDT needs and the lower-level needs were both important.

Hypothesis 3 was also supported in that interaction effects were small and inconsistent both across and within measures. Because no single interaction emerged consistently across both the RQJS and the WOC, we do not discuss these coefficients.

Finally, we tested Hypothesis 4, which suggested that high-level satisfactions might mediate between low-level satisfactions and the five work outcomes. Evidence of mediation is already seen in Table 3, in that the low level satisfaction coefficients were reduced in size at Step 2, when the three high-level satisfaction variables were entered into the equation (i.e., the relationship between security and well-being was reduced from .50 to .38 at Step 2). To formally test mediation we conducted analyses using the composite low-level and high-level satisfaction variables, since we only had hypotheses about the two levels, not the specific members of those two levels. For both RQJS and WOC and all five dependent variables significant partial mediation was supported (standardized indirect effect varied between .15 and .26, all $ps < .01$ for RQJS and between .16 and .25, all $ps < .01$ for WOC). We also tested the significance of this indirect effect using

bootstrapping procedures. Unstandardized indirect effects were computed for each of 5000 bootstrapped samples, and the 95 % confidence intervals were computed by determining the indirect effects at the 2.5th and 97.5th percentiles. The bootstrapped unstandardized indirect effects and the 95 % confidence intervals for all 5 dependent variables both for RQJS and WOC as well as standardized betas are presented in Table 7 (see Appendix 2). In no cases did the confidence intervals include zero indicating their statistical significance.

However due to the correlational design of the study, we cannot exclude the possibility that the direction of mediation is the opposite way—e.g., that the path between high-level need satisfaction and well-being is mediated by low-level need satisfaction. To evaluate which causal direction might be better supported, we ran path analyses for both the low- and high-level satisfaction measures (for both the RQJS and the WOC) and all five outcomes measures, comparing the information criteria of the low-to-high-to-WB model versus the high-to-low-to-WB model. In all 10 cases AIC, BIC and adjusted BIC were lower when high-level need satisfaction was the mediator than when low-level need satisfaction was the mediator.¹ Although this result is consistent with a causal path leading from low-level need satisfaction through high-level need satisfaction to well-being, it should be noted that comparisons

¹ AIC, BIC and adjusted BIC were at least 2000 lower for the model using high-level need satisfaction as a mediator comparing to the model using low-level need satisfaction as mediator for RQJS and at least 500 lower for WOC. All the data on mediation analysis are available upon request.

Table 3 Study 1: Regression analyses of the effects of low and high level need-satisfaction upon work outcomes, including both main effects and low $\times$ high level moderation effects

Measure and step of the analysis	Dependent variables									
	Well-being		Work engagement		Organizational commitment		Professional achievement		Intrinsic work motivation	
	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2
<i>RQJS measure</i>										
Step 1										
1. Security	.54**	.361**	.27**	.114**	.33**	.282**	.33**	.145**	.32**	.177**
2. Financial	.13**		.13**		.31**		.11**		.18**	
Step 2										
1. Security	.42**		.07**		.16**		.08**		.11**	
2. Financial	.09**		.06**		.23**		.02*		.09**	
3. Autonomy	.18**	.085**	.49**	.257**	.34**	.185**	.66**	.459**	.38**	.247**
4. Competence	.11**		.07**		.18**		.02*		.20**	
5. Relatedness	.15**		.09**		.10**		.13**		.15**	
Step 3										
1. Low-level $\times$ high-level	.02	.000	-.02	.000	.03**	.001**	-.02*	.001*	-.06**	.003**
<i>WOC measure</i>										
Step 1										
1. Financial	.20**	.177**	.18**	.066**	.34**	.216**	.11**	.054**	.22**	.089**
2. Security	.26**		.11**		.18**		.15**		.11**	
Step 2										
1. Financial	.07**	.061**	.07**	.037**	.18**	.068**	.03	.037**	.10**	.052**
2. Security	.10**		-.02		-.02		.04*		-.05*	
3. Autonomy	.22**		.22**		.35**		.14**		.17**	
4. Competence	.01		-.02		.01		-.05**		.07**	
5. Relatedness	.18**		.11**		.09**		.17**		.16**	
Step 3										
1. Low-level $\times$ high-level	-.01	.000	-.05**	.003**	-.02	.001	-.02	.000	-.03	.001

* $p < .05$; ** $p < .01$

involving AIC are considered weak evidence (Thoemmes 2015).

Study 1: Discussion

Study 1 suggests that both low-level and high-level psychological need satisfaction play a role in explaining well-being and work-engagement. Supporting Hypotheses 1 and 2, a “parallel main effects” model obtained for the two categories of need, in which both types of experiences contribute to people’s well-being and engagement at work. Thus, the data support both the SDT needs model and at least a two-level construal of the well-known Maslow need hierarchy. Failing to support Maslow’s theory, however, there were no consistent moderator effects involving lower-level needs and higher-level needs (as expected by Hypothesis 3). In particular, there was no consistent support for the

“prepared to benefit” interpretation of Maslow’s theory, in which high-level satisfactions are expected to have stronger effects if low-level satisfactions are present (i.e. a worker who overcomes concerns with job-security may be better able to cultivate and savor higher-level satisfactions like mastery and companionship). Instead, the three SDT needs had the same robust effects regardless of the degree of low-level need-satisfaction. Still, Maslow’s theory was supported in a different way: the positive effects of low-level need-satisfaction upon the work outcomes were partially mediated by the effects of high-level need-satisfaction (Hypothesis 4). This suggests that a boost in a person’s low-level need-satisfaction (i.e., boosted security or pay at work) might assist them in the development of later high-level satisfactions (i.e., subsequent boosts in autonomy, competence, and relatedness), helping their well-being to approach a maximum. Of course, longitudinal data will be required to confidently test such a causal process model.

Study 2: Methods

Study 2 aimed to replicate and extend the Study 1 findings using a different work context and company (a sample of workers of Russian heating and water service company), and using other indicators of optimal functioning at work. Our four hypotheses remained the same.

Participants and procedure

10,827 blue- and white-collar workers of a Russian heating and water service company (6824 males, 4002 females, 1 missing) from 10 Russian regions participated in the study. They ranged from 16 to 77 years old ($M = 42.16$, $SD = 12.06$). Job positions included 1251 (11.6 %) low-level workers, 3644 (33.7 %) middle-level workers, 2262 high-level workers (20.9 %), 395 employees (3.6 %), 1996 (18.4 %) specialists, 775 (7.2 %) direct managers, 403 (3.7 %) middle-level managers, 55 (.5 %) top-managers. In terms of services presented 1508 (14.6 %) participants worked in water provision, 1212 (11.7 %) worked in water allocation, 1723 (16.7 %) worked in electricity, 1706 (16.5 %) worked in heating, 4171 (40.4 %) were involved in more than one activity, and 11 (.1 %) did not answer this item. The procedure for Study 2 was almost identical to Study 1; employees completed the questionnaire during their work time, which was presented via organizational interface. Again, respondents did not provide their identities.

Measures

Low-level and high-level need satisfaction was measured using a briefer version of the WOC measure described in Study 1. This shortened version included 16 items (autonomy, competence and relatedness satisfaction were assessed with two items instead of three). Cronbach's α was .72 for the low-level need satisfaction composite (.64 for financial satisfaction and .62 for satisfaction with security) and varied from .62 to .77 for autonomy, competence and relatedness satisfaction (.80 for the composite high-level need satisfaction composite). A 2-factor solution explained 64.68 % of variance for low-level need satisfaction (item loadings ranged from .70 to .92) and a 3-factor solution explained 78.72 % of the variance in high-level need satisfaction (loadings ranged from .68 to .89).

Well-being at work. According to Schaufeli and Salanova (2014), there are three basic states of mind for employees: work engagement, burnout and boredom. Study 1 considered one of these states (work engagement). Study 2 again measured engagement, but with a shorter (6-item)

version of the UWES, derived from item analyses of the Study 1 data. Study 2 also assessed boredom and burnout. Specifically, three items from the Dutch Boredom Scale (DUBS, Reijseger et al. 2013; “I feel bored at my job”) and three items from the Maslach Burnout Inventory—General Survey (MBI-GS, Schaufeli et al. 1996; “I feel used up at the end of the workday”) were chosen by a group of HR experts of the organization to measure the two constructs. Furthermore, three new items were formulated for this study to measure alienation at work, conceptualized as the opposite of organizational commitment (i.e. “It doesn't matter how much effort I make at work, there is nothing I can change”, and “The main purpose of the employer—to exploit workers to the fullest and to give him as little as possible in return”). Principal components analysis of the above items revealed a clear 4-factor structure corresponding to work engagement, boredom, burnout and alienation (60.8 % of variance explained, factor loadings .50–.84), suggesting that the four measures indeed tap distinct constructs. Finally, intrinsic motivation was measured the same way as in Study 1.

Results

Comparing the Study 1 and Study 2 organizations

Descriptive statistics and correlations of all variables are presented in Table 4. Because any differences in patterns of need satisfaction and their effects on work outcomes could be the result of socio-demographic and organization-specific features of organizations, we first compared the organization from Study 1 with the organization from Study 2. Given the large sample sizes involved, there were many significant mean differences; we describe only differences in effect size higher than .20 (Pearson's r for continuous variables and contingency coefficient CC for categorical variables).

There were small differences between organizations in job position structure ($CC = .24$): the Study 2 sample included a higher proportion of high-level blue-collar workers and high-level managers. Participants in Study 2 had (on average) worked in their organization for less time than participants in Study 1 ($r = .30$). No prominent differences between organizations were found in terms of gender, age, education, family status, or number of children. To compare organizations on their psychological characteristics, we first re-computed some scores from Study 1 using the smaller item sets employed in Study 2. Participants from Study 2 were less engaged in their work ($r = .35$) and less financially satisfied ($r = .23$) comparing to participants from Study 1. All other effect sizes were lower than .12.

Table 4 Study 2: Descriptive statistics and correlations between variables

Scales	<i>M (SD)</i>	2	3	4	5	6	7	8	9	10	11	12
1. WOC—financial	2.46 (.91)	.53	.80	.55	.39	.36	.54	.14	−.05	−.24	−.37	.14
2. WOC—security	3.24 (1.03)		.93	.61	.48	.45	.63	.16	−.14	−.26	−.33	.16
3. WOC—low-level composite	2.92 (.87)			.67	.50	.47	.68	.17	−.12	−.29	−.39	.17
4. WOC—autonomy	3.37 (1.07)				.49	.59	.86	.21	−.18	−.30	−.38	.19
5. WOC—competence	3.64 (1.11)					.35	.77	.12	−.18	−.26	−.16	.14
6. WOC—relatedness	3.93 (1.04)						.79	.22	−.21	−.27	−.29	.19
7. WOC—high-level composite	3.65 (.86)							.22	−.23	−.34	−.34	.21
8. Work engagement	4.12 (1.51)								−.30	−.24	−.26	.56
9. Boredom at work	1.61 (1.02)									.25	.08	−.24
10. Burnout at work	2.23 (1.39)										.31	−.31
11. Alienation at work	3.44 (.97)											−.25
12. Intrinsic work motivation	3.69 (1.03)											

All $ps < .01$

Hypothesis tests

Next we again compared the lower-level and higher-level need satisfaction variables as predictors of the outcome variables, examining both main effects and moderator effects within the five regression models (one model for each outcome). Because need-satisfaction was measured in only one way, we could not again use the strategy of only interpreting effects that replicated across two measures. As before, the two low-level satisfaction variables (financial and security) were entered at Step 1, the three SDT variables (autonomy, competence, and relatedness) were entered at Step 2, and a low-level $\times$ high-level interaction term was entered at Step 3.

As can be seen in Table 5, the major effects of Study 1 were replicated in Study 2. At Step 1, the two low-level need-satisfaction variables both had significant effects on all five outcome variables. At Step 2, these effects were reduced when autonomy, competence, and relatedness were entered into the equation; still, at this step, 22 of 25 effects were significant. Overall, Hypotheses 1 and 2 were well supported, in that both lower-level and higher-level needs were important.

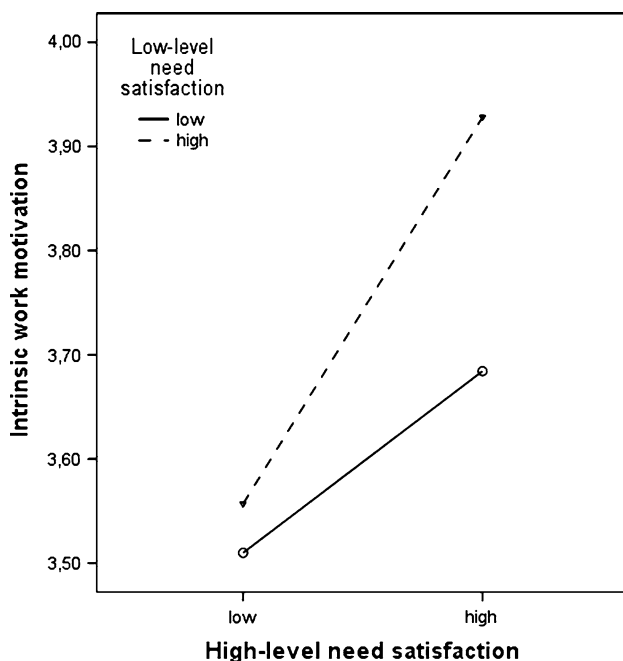
Hypothesis 3 was also supported in that interaction effects were small. However in Study 2 there was a consistent pattern of small moderator effects, in support of the Maslow “prepared to benefit” hypothesis. That is, the best work outcomes were observed when both low and high level need-satisfactions were simultaneously present; stated differently, the association between high-level satisfaction and well-being was stronger when low-level satisfaction was higher. Figure 1 graphs this relationship for the intrinsic motivation outcome variable.

Finally, we again tested Hypothesis 4, which said that high-level satisfactions might mediate between low-level satisfactions and the five work outcomes. Evidence of mediation is already seen in Table 5, in that the low level satisfaction coefficients were somewhat reduced in size at Step 2, when the three high-level satisfaction variables were entered into the equation. For all five dependent variables there was significant partial mediation effects (standardized indirect effect varied between .11 and .13 for work engagement and intrinsic motivation and $-.18$ to $-.11$ for boredom, burnout and alienation at work, all $ps < .01$). We tested the significance of this indirect effect using bootstrapping procedures, as in Study 1. The bootstrapped unstandardized indirect effects and the 95 % confidence intervals for all 5 dependent variables as well as standardized betas are presented in Table 7 (see Appendix 2). Comparisons of information criteria for opposite path models (using low-level vs. high-level need satisfaction as a mediator) revealed that AIC, BIC and adjusted BIC in all 10 cases were lower if high-level need satisfaction was used as a mediator, as specified by the “prepared to benefit” interpretation of the Maslow theory.² Once again, however, the correlational design does not allow for a strong test of the hypothesis.

² All the data on mediation analysis are available upon request. AIC, BIC and adjusted BIC were 60–70 lower for the model using high-level need satisfaction as a mediator comparing to the model using low-level need satisfaction as the mediator.

Table 5 Study 2: Regression analyses of the effects of low and high level need-satisfaction upon work outcomes, including both main effects and low $\times$ high level moderation effects

Measure and step of the analysis	Dependent variables									
	Work engagement		Boredom at work		Burnout at work		Alienation at work		Intrinsic motivation	
	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2
<i>Step 1</i>										
1. Financial	.09**	.030**	.04**	.020**	-.14**	.078**	-.26**	.160**	.09**	.027**
2. Security	.11**		-.16**		-.18**		-.20**		.10**	
<i>Step 2</i>										
1. Financial	.04**		.10**		-.07**		-.20**		.04**	
2. Security	.02		-.04**		-.05**		-.11**		.02	
3. Autonomy	.09**	.028**	-.06**	.040**	-.11**	.044**	-.21**	.042**	.08**	.018**
4. Competence	.00		-.11**		-.12**		.10**		.04**	
5. Relatedness	.14**		-.15**		-.12**		-.09**		.10**	
<i>Step 3</i>										
1. Low-level $\times$ high-level	.04**	.001**	-.05**	.002**	-.04**	.001**	-.06**	.003**	.05**	.002**

* $p < .05$; ** $p < .01$ **Fig. 1** Interaction effect of higher and basic need satisfaction on intrinsic motivation

Study 2: Discussion

Study 2 replicated the most basic results of Study 1. Consistent with Hypothesis 1, the three SDT need-satisfaction measures had strong associations with measures of worker morale, associations which were independent of the low-level need-satisfaction effects. Consistent with

Hypothesis 2, the lower level need variables also had significant effects. Recall that Hypothesis 3 said there would be few low-level $\times$ high-level moderator effects, which was the case in Study 1. However in Study 2 a pattern of weak moderator relationships was found, fitting the “prepared to benefit” interpretation of Maslow’s hierarchical theory. Specifically, workers evidenced the highest degree of intrinsic motivation, organizational commitment, and engagement, when they had both kinds of needs met. Still, the lack of consistent interactions across the two studies supports Hypothesis 3, which did not expect to find strong or consistent interactions. Finally, Study 2 replicated Hypothesis 4, with analyses suggesting that the SDT needs may be both facilitated by, and also carry the effects of, low-level need-satisfaction. In other words, hierarchical regressions supported this particular way of conceptualizing the need hierarchy.

General discussion

Abraham Maslow’s notion that people can “climb a ladder” during their lifetimes, moving towards an ever more actualized version of themselves, remains appealing in psychology and in western culture more generally. But despite this continuing influence, little research has supported the more interesting facets and implications of Maslow’s hierarchical theory. Are people less able to benefit from higher-level motives and feelings if they have lower-need deficiencies? Or on the other hand, are higher-level motives and feelings especially impactful in precisely

such deprived conditions? Or, are there merely main effects of the various needs, without any low $\times$ high moderator relations? Which type of need (low-level or high-level) should managers, authorities, parents, or teachers, focus on satisfying within their subordinates, in order to help subordinates function and thrive to a maximal extent, thereby benefitting the authority and organization as well as the subordinate?

In this research we examined the issues anew, by combining tenets of both SDT and Maslow's theory. We inserted SDT's three basic needs into the second level of a two-level hierarchy, replacing Maslow's higher-level love/belonging, self-esteem, and self-actualization needs with relatedness, competence, and autonomy needs. However we did retain two more basic needs involving psychological security and financial/biological satisfaction, to represent the lower level of Maslow's hierarchy.

Our results, derived from two very large-N studies of Russian work organizations, provide a consistent picture. All five measures (autonomy, competence, and relatedness, and also security and financial) had significant main effects upon the outcomes, as predicted by Hypotheses 1 and 2. The findings have potentially important theoretical implications, given that SDT researchers have long used findings that "X predicts well-being" as evidence to support a proposal that "X is a basic psychological need" (Reis et al. 2000; Sheldon et al. 1996). For example, Sheldon et al. (2001) tested 10 "candidate" psychological needs, claiming that SDT's autonomy, competence, and relatedness experiences were thereby validated as needs because each uniquely predicted the degree of well-being felt during "highly satisfying life-events" that participants had described and rated. By our data, perhaps security and money should be counted as basic psychological needs?

Notably, security was not identified as a basic need by the Sheldon et al. (2001) research strategy, and neither was money/luxury. In other words, and perhaps unsurprisingly, the "most satisfying events" that came to participant's minds did not tend to be events in which they felt safe or felt rich. However, Sheldon et al. (2001) found that in an alternative methodology, in which students described and rated "most unsatisfying events," security *did* emerge within the top tier of validated need constructs. Sheldon et al. (2001) also acknowledged that their security and money effects may have been limited by ceiling effects, given that most participants within their U.S. college student sample had relatively secure and stable life-circumstances. Thus, we can surmise that the current study's focus on need-satisfaction in the (difficult to control) work context, plus the current study's focus on (mostly poorly paid) Russian worker samples, may have given security and financial needs a better chance to show their influence. In this Russian work context, feeling that life is stable and

predictable, and that one is making enough money, both contributed to positive outcomes such as organizational commitment, subjective well-being, and work engagement.

Again, do the current results suggest that security and money needs should be admitted to the SDT need pantheon, along with autonomy, competence, or relatedness? We suspect that SDT could perhaps make room for a security need, although most would continue to argue that the combination of autonomy, competence and relatedness should handle security (Ryan and Deci 2008). However SDT researchers would probably never endorse a financial security need, given SDT's construal of money as an extrinsic motivator which undermines intrinsic motivation, and its construal of financial success values as degrading, potentially undermining of well-being (Kasser 2002). Here, we will only suggest that for the majority of the world's population, i.e. those living in second- or third-world countries, having greater financial security would probably make a measurable difference in their well-being. And of course, income is known to correlate positively (albeit modestly) with SWB, even in first-world countries (Diener 1994). Still, we would not call financial satisfaction a basic need, because we view monetary resources mainly as a platform for obtaining what is of real intrinsic value, namely the higher-level satisfactions. In other words, *having* money is a good thing, because it gives an important tool for living well; the problem only arises if one *values* money overmuch (Kasser 2002), which is a different issue.

This brings us to the H4 findings, in which the effects of lower-level need-satisfaction on outcomes were partially mediated by higher-level need-satisfaction. As explained above, we suggest that adequate security can provide a "platform" for working on more meaningful pursuits. The H4 mediational finding is consistent with this, supporting Maslow's model in a new way by suggesting that getting one's lower-level needs met helps one to get one's higher-level needs met, which in turn leads to the most positive outcomes. This is not to say that lower-level needs are purely instrumental for higher-level needs, since the lower-level need effects were not fully mediated; they retained influence even after higher-level needs were in the equation. Also, higher-level need effects are not just carriers of lower-level need effects, since the higher-level needs remained significant even with lower-level needs in the equation. The two types of need are complementary, not substitutable.

Of course, the merely cross-sectional nature of the current studies demand that we hesitate before accepting any inferences of causal processes, such as the inference that "low level satisfactions help with high level satisfactions which then help with positive outcomes". However, we believe our general approach can provide a template for

conducting relevant longitudinal research. One can imagine even more complex processes beyond the one described above, processes that could be tested with appropriate longitudinal data. For example, although higher-level satisfaction might be more difficult to increase in the presence of low-level dissatisfaction, if it can be done nonetheless, it might give people the resources to finally fully cope with and resolve lower-level problems.

Considering the work context in particular, one question raised by the H4 results is: should managers focus first and primarily upon improving worker security (compensation and working conditions), thereby enabling workers to self-organize to acquire the rest of the (higher-level) satisfactions that they need on their own? Or should managers instead focus first on boosting worker's high-level satisfactions first, even in the absence of pay and security, so that the low-level problems do not drag workers down as far? The current studies provide potential support for both ideas. In the mediational models involving well-being, low-level satisfaction was more predictive of high-level satisfaction than vice versa, suggesting that low levels are the place to focus in order to maximize both kinds of satisfaction. On the other hand, higher-level satisfaction was more proximately related to well-being than low-level satisfaction, suggesting that higher levels are the place to focus in order to maximize well-being. Again, multi-wave longitudinal research is required to explore these issues and trade-offs.

H3 stated that there would be few if any low-level $\times$ high-level moderator effects, and that if found, such effects would be very small, and/or would not replicate across studies. This is essentially what we observed. No moderator effects emerged in Study 1, but some weak moderator effects emerged in Study 2. Specifically, Study 2 found some support for the “prepared to benefit” moderator supposition that was derived from Maslow's theory. To remind, the idea is that high-level satisfactions can have larger effects on positive outcomes when low-level satisfactions are simultaneously present, derived from Maslow's proposal that attention cannot move up to, or benefit from, higher levels until lower levels are taken care of. As was illustrated in Fig. 1, the association between high-level need-satisfaction and the positive work outcomes was stronger when participants had also satisfied their safety and financial security needs, and weaker when they had not. Again, however, these effects were quite small, and perhaps were significant only because of the 11,000 worker sample size; significant effects were not found in Study 1, which was a study of 4000 Russian workers. Thus we are tempted to conclude that there are few if any high/low need-contingency relations, and that main effects are likely much more important. However, future research with different scales or methodologies may

perhaps be more successful at teasing out consistent moderator effects.

How might the Maslow and SDT perspectives on needs be resolved or integrated? Although this is a large question with many moving parts, the current results offer a number of suggestions. First, the SDT model was supported in nearly every way; the SDT needs had simultaneous main effects and did not moderate each other's effects. Still, our data suggest that at least in the work context, experiences of security/stability and financial sufficiency may also be important. As discussed above, however, this does not necessarily mean that security and money are “needs” in the sense that SDT defines needs (namely, as terminal experiential goods). In addition, there are many other criteria for identifying basic needs besides showing that they predict positive emotional outcomes (Baumeister and Leary 1995), criteria which remain to be studied by the methods introduced herein. Thus it appears that for now, SDT might remain unmodified.

In contrast, it appears that the Maslow model may need some updating. First, the three SDT needs (autonomy, competence, relatedness) may better represent the “higher levels” of a hierarchy than the three needs originally identified by Maslow (love/intimacy, self-esteem, self-actualization). The three SDT needs are hierarchically equivalent, befitting a focus on just 2 levels rather than 5 levels of a hierarchy (Sheldon et al. 2001), and all three SDT needs were found to be important in the current research, just as in much past research, whereas self-actualization and self-esteem needs may be less important (Crocker and Park 2004; Sheldon 2011). Still, the current mediational findings do have a hierarchical flavor, suggesting that once lower-level needs are met people may be better able to get their higher-level needs met, which in turn influences their work outcomes and well-being. Also, the small low-level $\times$ high-level moderational findings of Study 2 provide some small support for the “prepared to benefit” idea, which is another significant implication of Maslow's theory. Thus, Maslow's hierarchical perspective upon needs is “not dead yet.”

Limitations and conclusions

There are a wide variety of study limitations, which merit consideration in interpreting the results and in designing future studies. First, the data were entirely self-report, a mono-method approach that needs to be supplemented with other data sources, such as observer report or objective work outcome measures such as raises, bonuses, and performance awards. Second, the need-satisfaction measures employed are non-standard in the SDT literature, and thus they have largely unknown properties and correlates. Also, the non-inclusion of the RQJS in Study 2 might explain the inconsistent moderator pattern found. Third, the data were correlational only, and cross-sectional only. Experimental

and longitudinal studies are required to thoroughly address the dynamic questions raised by our results. For example, do boosted lower-level needs really provide a platform boosted higher-level needs? Only lagged study designs can tell. Fourth, the data come from only a single nation (Russia) and a single type of organization (energy, heating, and water), and thus the patterns require replication in other kinds of work organizations and other kinds of cultural settings.

Still, the current studies may point the way to new ways of thinking about and researching the dynamics of psychological needs, and new ways of perhaps resolving perennial confusions and contradictions between different theories of needs (see also Kenrick et al. 2010; Sheldon 2011; Yang 2003). We look forward to collecting such data ourselves.

Compliance with ethical standards

Ethical standard Compliance with ethical standards: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

Conflict of interest None.

Appendix 1

Table 6 Items of RQJS and WOC

Measure/scale	Items
<i>WOC</i>	<i>To what extent do the following work conditions need to be improved?</i>
Financial	Payment The bonus system
Security	Guarantee of stable employment, confidence that one will not be fired Social insurance
Autonomy	Activity of trade unions Leadership style in the whole company Support of the workers' initiative Following the rights of the workers
Competence	Opportunities for job-related training Opportunities for carrier Match of my work to my personal abilities
Relatedness	Leadership style in subdivision Relationships with the direct manager Relationships in the collective
<i>RQJS</i>	<i>Please, rate your agreement or disagreement with the statements below</i>
Financial	My salary fits my qualification, knowledge, abilities and skills My salary is suitable to my efforts
Security	I have a respectable social status I have a good health I feel security, stability, confidence in the future
Autonomy	I am interested in what I am doing in this job Firstly I like my job because I have the possibility to know something new Every month I feel that my professional knowledge is increasing
Competence	My work position doesn't match my abilities I don't like that, in this job, I don't have further possibilities to develop Working here, I feel that I am losing my knowledge, skills and abilities
Relatedness	I have a good relationship with my colleagues The people that I am working with respect me I like the people I work with

Appendix 2

Table 7 Mediation analysis of high level need-satisfaction upon low level need-satisfaction and work outcomes path in Study 1 and Study 2

Measure and dependent variables	β Low level need satisfaction—High level need satisfaction	β High level need satisfaction—DV	β Low level need satisfaction—DV	Standartized indirect effect	Unstandartized indirect effect [95 % bootstrapped 5000 CI]	AIC	BIC (adjusted sample size)	χ^2 ($df = 3$)
<i>Study 1—RQJS measure</i>								
Well-being	.42**	.37**	.36**	.16**	.45** [.41, .49]	25,146.25	25,169.20	3179.13*
Work engagement	.42**	.50**	.11**	.21**	3.79** [3.53, 4.08]	42,986.74	43,009.69	2620.71**
Organizational commitment	.42**	.47**	.33**	.20**	3.24** [3.01, 3.48]	40,909.84	40,932.79	3783.83**
Subjective achievement	.42**	.63**	.07**	.27**	.82** [.77, .88]	25,221.59	25,244.54	3692.27**
Intrinsic motivation	.42**	.55**	.17**	.23**	.91** [.85, .98]	27,857.88	27,880.84	3387.25**
<i>Study 1—WOC measure</i>								
Well-being	.74**	.33**	.18**	.25**	.63** [.57, .70]	26,562.79	26,585.74	4944.75**
Work engagement	.74**	.24**	.07**	.18**	2.87** [2.44, 3.32]	44,611.46	44,634.41	4178.15**
Organizational commitment	.74**	.34**	.20**	.25**	3.65** [3.28, 4.02]	42,758.60	42,781.56	5117.23**
Subjective achievement	.74**	.22**	.07**	.16**	.45** [.37, .53]	27,982.11	28,005.07	4113.91**
Intrinsic motivation	.74**	.34**	.04**	.25**	.88** [.78, .97]	30,007.67	3003.62	4419.18**
<i>Study 2—WOC measure</i>								
Work engagement	.66**	.19**	.05**	.13**	.22** [.20, .25]	59,608.92	59,637.71	677.73**
Boredom at work	.66**	−.26**	.06**	−.17**	.20** [.22, .18]	50,826.81	50,855.60	6783.63**
Burnout at work	.66**	−.28**	−.10**	−.18**	.30** [.32, .28]	57,133.75	57,162.53	7609.04**
Alienation at work	.66**	−.16**	−.29**	−.11**	.12** [.14, .11]	48,931.71	4896.49	8179.96**
Intrinsic motivation	.66**	.17**	.05**	.11**	.13** [.12, .15]	51,398.40	51,427.18	6689.28**

* $p < .05$; ** $p < .01$

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